RD-200/300 SERVICE NOTES

SPECIFICATIONS

ERRATA & SUPPLEMENT is attached at the end of the page. *First Edition*

Keyboard	76 key, E to G RD-200
	88 key, A to C RD-300
Note	
16	PIANO 1, PIANO 2, PIANO 3
	VIBRAPHONE, E. PIANO 1
10	HARPSICHORD, CLAVI, E. PIANO 2
Tunable Range	± 15 cents
Output Level	H: +10dB, M: 0dB, L: −10dB
Power Consumption	20W : 100V/117V
	25W : 220V/240V
Dimensions	1142(W) x 422 (D) x 107(H) mm
	44-15/16 x 16-5/8 x 4-3/16 in. RD-200
	1405(W) x 461(D) x 133(H) mm
	55-5/16 x 18-1/8 x 5-1/4 in. RD-300
Weight	16 kg/35 lb. 4 oz. RD-200
	27.2 kg/60 lb. RD-300

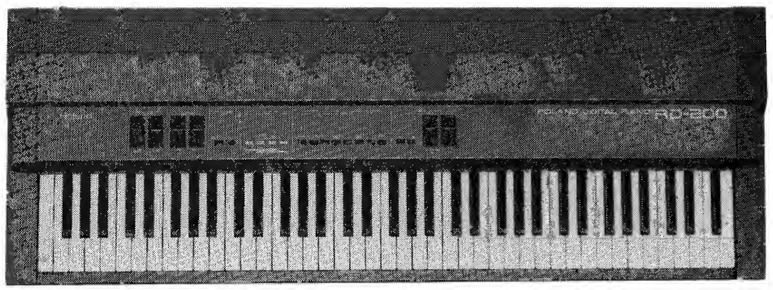


PHOTO RD-200

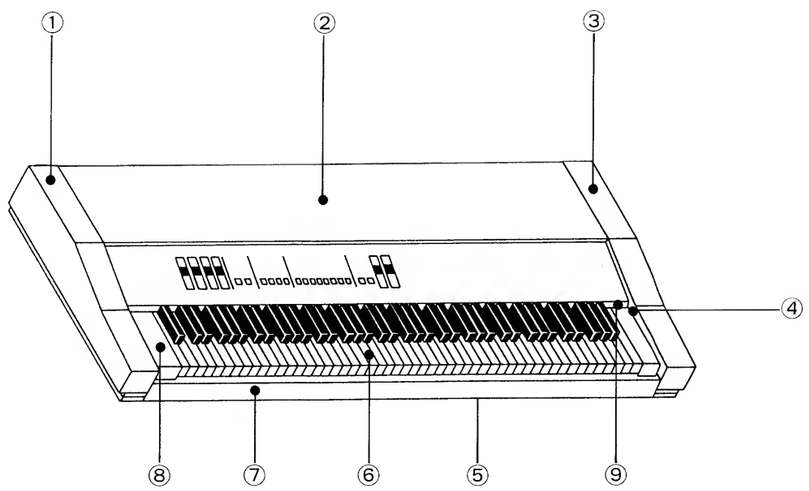
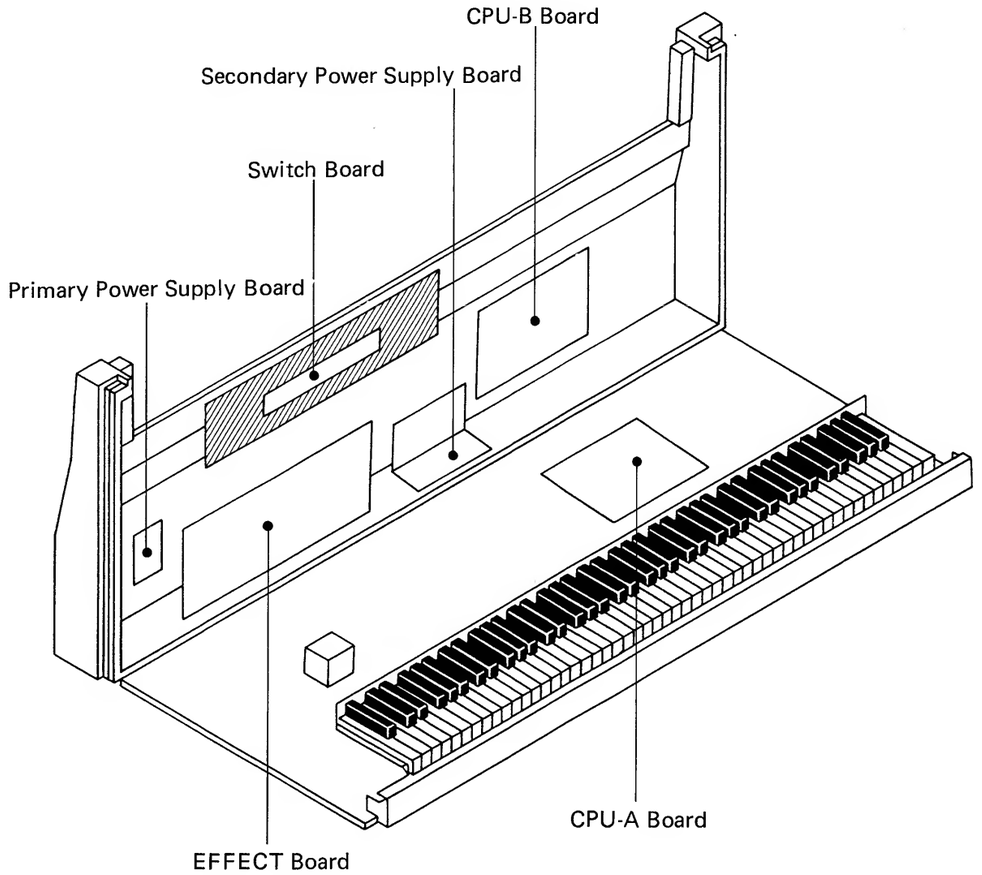
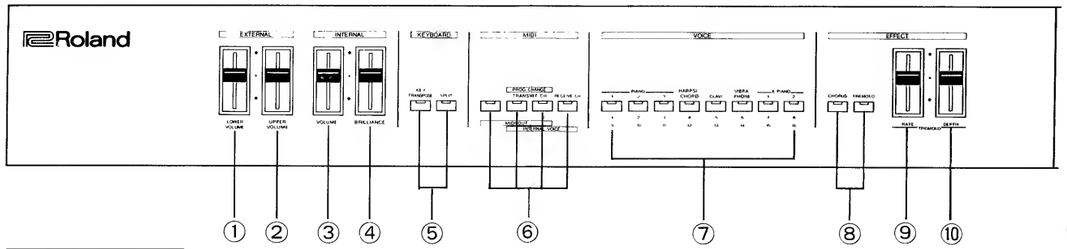


Illustration RD-300

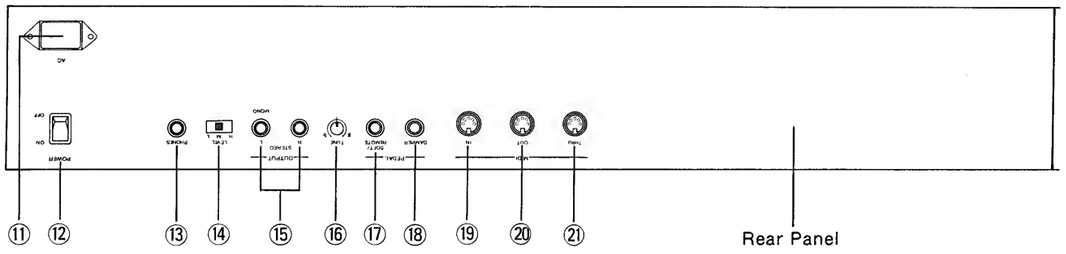


No.	Parts Number	Parts Name Description	Model
①	21125283 21125277	Side Panel Left 側板 左	RD-200 RD-300
②	22215531 22215520	Top Panel トップパネル	RD-200 RD-300
③	21125284 21125278	Side Panel Right 側板 右	RD-200 RD-300
④	22125224 22125220 22125225 22125221	Plate Left プレート 左 Plate Right プレート 右	RD-200 RD-300 RD-200 RD-300
⑤	21135156 21135155	Base 底板	RD-200 RD-300
⑥	7617720000 7617520000	Keyboard Assy SK-476CW 鍵盤完 SK-588BW	RD-200 RD-300
⑦	21145227 21145224	Blind 口板	RD-200 RD-300
⑧	21165130	End Block Left/Right 拍子木 右/左	RD-300 only
⑨	22265121	Key Felt キーフェルト	RD-200/300

RD-200/300



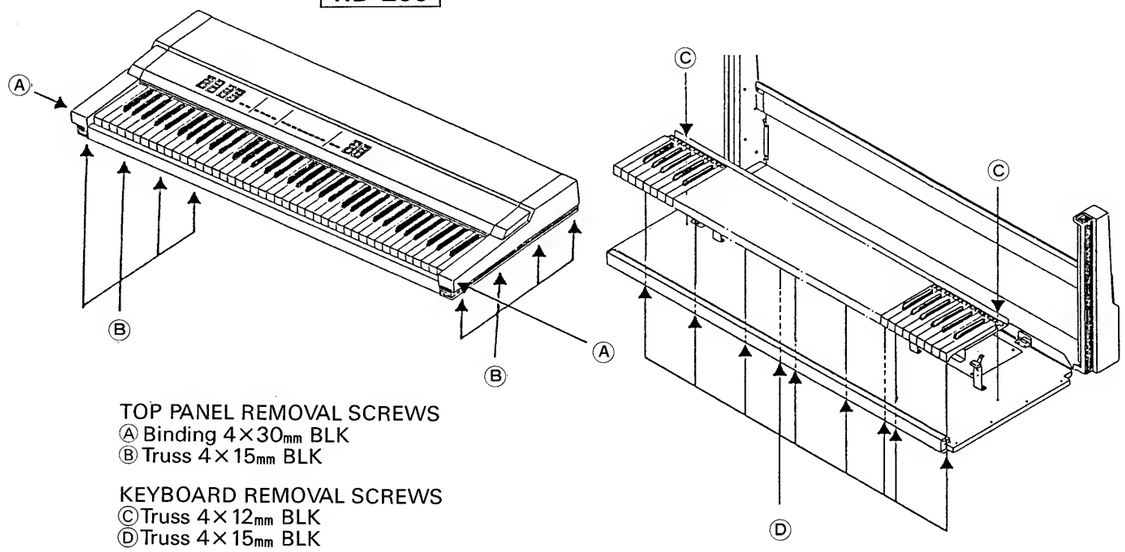
RD-200/300



① ②	Knob Escutcheon Pot.	EWA-NFE-x15B14	10KB	22485126 22225320 13339453
③	Knob Escutcheon Pot.	EWA-NA0-x15A14	10KAx2	22485126 22225320 13359356
④	Knob Escutcheon Pot.	EWA-NA0-x15B14	10KBx2	22485126 22225320 13359353
⑤ ⑥ ⑧	Button Switch	black SKHHPM001		22475651 13169668
⑦	Button Switch	gray SKHHPM001		22475652 13169668
⑨	Knob Escutcheon Pot.	EWA-NFE-x15A15	100KB	22485126 22225320 13339453
⑩	Knob Escutcheon Pot.	EWA-NFE-x15A14	10KA	22485126 22225320 13339454
⑪	AC Inlet	PA-126 2P 100/117/220V CM-3 3P 240V		13429710 13429708
⑫	Switch	WK2A443A		13149108
⑬	Jack	YKB-21-5010		13449145
⑭	Switch	HSW0372-01-520		13159322
⑮	Jack	YKB-21-5006		13449252
⑯	Knob Encorder	EVQ-VWKF1531G		22485109 13279291
⑰ ⑱	Jack	YKB21-5012		13449146
⑲ ⑳ ㉑	Socket	TCS5350-01-1111 DIN		13429615

DISASSEMBLY

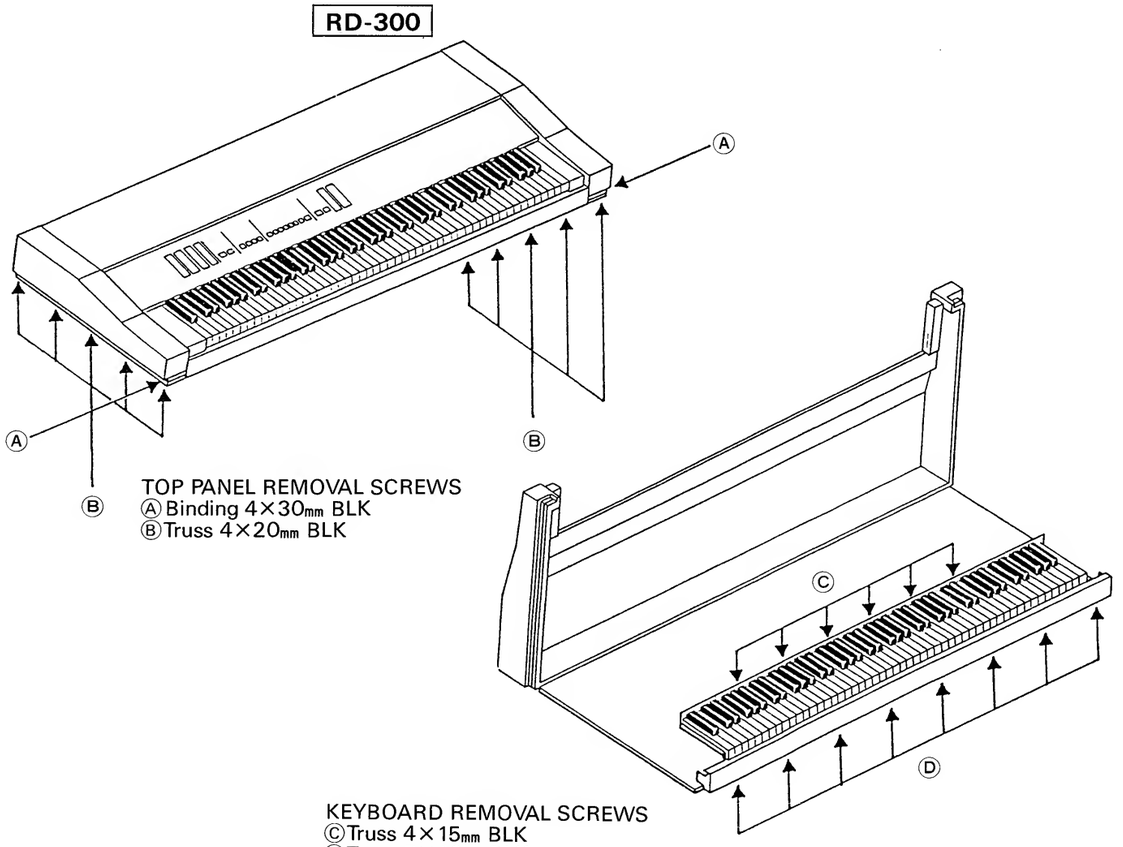
RD-200



TOP PANEL REMOVAL SCREWS
Ⓐ Binding 4×30mm BLK
Ⓑ Truss 4×15mm BLK

KEYBOARD REMOVAL SCREWS
Ⓒ Truss 4×12mm BLK
Ⓓ Truss 4×15mm BLK

RD-300



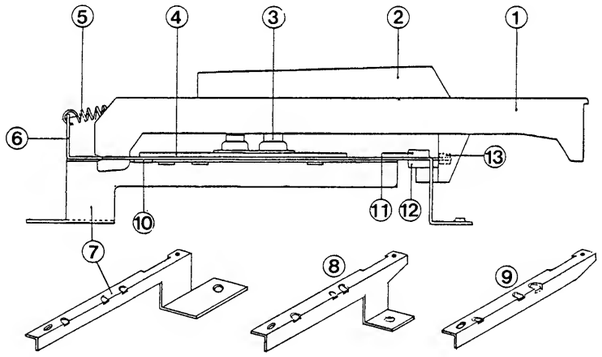
TOP PANEL REMOVAL SCREWS
Ⓐ Binding 4×30mm BLK
Ⓑ Truss 4×20mm BLK

KEYBOARD REMOVAL SCREWS
Ⓒ Truss 4×15mm BLK
Ⓓ Truss 5×40mm BLK

RD-200

KEYBOARD ASSY SK-476CW
7617720000

No.	PARTS No.	PARTS NAME	
①	22575145-0A	NATURALKEY C	白鍵
	22575146-0A	NATURALKEY D	白鍵
	22575147-0A	NATURALKEY E	白鍵
	22575148-0A	NATURALKEY F	白鍵
	22575149-0A	NATURALKEY G	白鍵
	22575150-0A	NATURALKEY A	白鍵
	22575151-0A	NATURALKEY B	白鍵
	22575189-0A	NATURALKEY E'	白鍵
	22575154-0A	NATURALKEY G'	白鍵
②	22575155-0A	SHARP KEY	黒鍵
③	22185216	KEY CONTACT	キー・コンタクト
④	7615222000	SWITCH PCB (LOW)	スイッチ基板完成品
	7615223000	SWITCH PCB (MID)	スイッチ基板完成品
	7615224000	SWITCH PCB (HI)	スイッチ基板完成品
⑤	22175167	NATURALKEY SPRING	白鍵スプリング
	22175168	SHARP KEY SPRING	黒鍵スプリング
⑥	22815491	CHASSIS	シャーシ
⑦	22035124	STAND	スタンド
⑧	22035125	STAND	スタンド
⑨	22125531	ANGLE	アングル
⑩	22135413	KEY STOPPER	キー・ストッパ
	22135414	KEY STOPPER	キー・ストッパ
⑪	22265447	STOP FELT	ストップ・フェルト
⑫	22265448	LEVEL FELT	レベル・フェルト
⑬	22155716	GUIDE BUSHING	ガイド・ブッシュ



SK-5 KEY REMOVAL PROCEDURE

BLACK KEY

Black key is easily removed with the top panel raised.

1. Remove the key spring.
2. Pull the key away from the back rail to disengage the rear notch in the key from the bracket. Lift the key.

NATURAL KEY

In order to remove a natural key, the keyboard must be separated from the base.

1. Move the keyboard rearward to free the key front ends from the blind.
2. Remove a black key adjacent to the natural key to be removed.
3. Using a screw driver, apply downward force to the rear edge of the key stopper. This will permit the rear key leg to slide on the key stopper top surface.

SK-5 キー交換法

黒鍵

トップパネルを開け、キースプリングを取りはずせば容易に抜き取れます。

白鍵

1. 鍵盤を止めているビスを取り除く。
2. 鍵盤を後ろへずらし、鍵盤の前端下部がブラインドに当たらないようにする。
3. 取り外そうとする白鍵の隣の黒鍵を外す。
4. 該当白鍵のキースプリングを取り外す。
5. ドライバーの先でキーストップを下へ押し付けながらキーを引き抜く。

SK-4 KEY REMOVAL PROCEDURE

NATURAL KEY

NOTE: In contrast with SK-5, natural keys are easier to remove on SK-4. Reverse holds true of black keys.

1. Remove the keyboard removal screws and raise the top panel.
2. Move the keyboard rearward to free the key front ends from the blind.
3. Remove key spring in the key to be removed.
4. Using a screw driver, apply downward force to the rear edge of the key stopper. This will permit the rear key leg to slide on the key stopper top surface.

BLACK KEY

1. To remove a black key, it is necessary to remove two natural keys adjacent to the black key to be removed. Follow "NATURAL KEY" removal procedure to remove them.
2. Follow the steps 3 and 4 in "NATURAL KEY" removal procedure to remove the black key.

SK-4 キー交換法

白鍵

注意 ＳＫ-４ではＳＫ-５とは逆に白鍵より黒鍵交換に、より手間がかかります。

1. トップパネルを開け、鍵盤をとめているビスを取り除く。
2. 鍵盤を後ろへずらし、鍵盤の前端下部がブラインドに当たらない様にする。
3. 該当白鍵のキースプリングを取り外す。
4. ドライバーの先でキーストップを下へ押し付けながらキーを引き抜く。

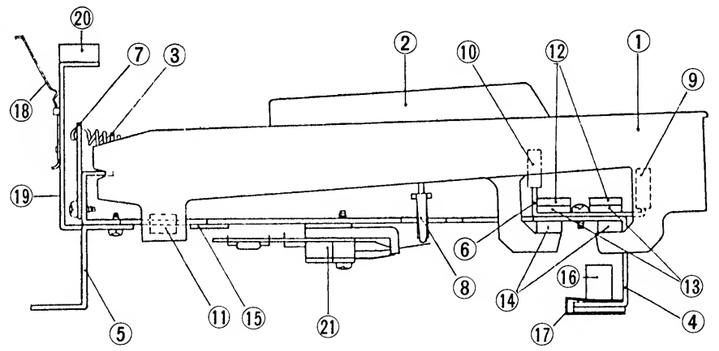
黒鍵

1. 黒鍵を取り外すには両側の白鍵を外す必要が有ります。
   上記"白鍵"のキー交換手順参照。
2. 該当黒鍵を"白鍵"のキー交換手順３、４と同様手順で取り外す。

RD-300

KEYBOARD ASSY SK-588EW
7617520000

No.	PARTS No.	PARTS NAME	
①	22575156	NATURAL KEY A 白鍵	
	22575157	NATURAL KEY B	
	22575158	NATURAL KEY C	
	22575159	NATURAL KEY D	
	22575160	NATURAL KEY E	
	22575161	NATURAL KEY F	
	22575162	NATURAL KEY G	
	22575163	NATURAL KEY A'	
	22575164	NATURAL KEY C'	
②	22575166	SHARP KEY 黒鍵	
③	22175146	KEY SPRING キースプリング	
④	22815539	CHASSIS 88P シャーシ 88P	
⑤	22035119	CHASSIS STAND シャーシスタンド	
⑥	22135522	KEY GUIDE 88P キーガイド 88P	
⑦	22125168	SPRING RETAINER 88P スプリングプレート	
⑧	22135202	ACTUATOR アクチュエータ	
⑨	22155740	GUIDE BUSHING A ガイドブッシュ A	
⑩	22155741	GUIDE BUSHING B ガイドブッシュ B	
⑪	22155739	GUIDE BUSHING C ガイドブッシュ C	
⑫	22265194	STOP FELT 88P ストップフェルト 88P	
⑬	22265345	STOP CUSHION ストップクッション	
⑭	22265416	LEVEL FELT 88P レベルフェルト 88P	
⑮	22135409	KEY STOPPER キーストッパ	
⑯	22155556	NUT ナット	
⑰	22125204	GROUNDING LUG アースプレート	
⑱	22175502	PANEL ANGLE SPRING	PANEL ANGLE ASSY パネルアングル完 22125548
⑲	22125535	PANEL ANGLE	
⑳	22265456	PANEL ANGLE CUSHION	
㉑	23164655	SK-5 MATRIX BOARD マトリクス ボード 40P	
	23165648	SK-5 MATRIX BOARD マトリクス ボード 48P	



PARTS LIST

CABINET

21135155	Base	底板	RD-300
21135156	Base	底板	RD-200
21145224	Blind	口板	RD-300
21145227	Blind	口板	RD-200
22215520	Top Panel	ﾄｯﾌﾟ･ﾊﾟﾈﾙ	RD-300
22215531	Top Panel	ﾄｯﾌﾟ･ﾊﾟﾈﾙ	RD-200
22125220	Plate left 左	ﾌﾟﾚｰﾄ	RD-300
22125224	Plate left 左	ﾌﾟﾚｰﾄ	RD-200
22125221	Plate right 右	ﾌﾟﾚｰﾄ	RD-300
22125225	Plate right 右	ﾌﾟﾚｰﾄ	RD-200
21125277	Side Panel left 左	側板	RD-300
21125283	Side Panel left 左	側板	RD-200
21125278	Side Panel right 右	側板	RD-300
21125284	Side Panel right 右	側板	RD-200
21165130	End Block	拍子木	RD-300
22325130	Hinge	ﾋﾝｼﾞ	
22265121	Key Felt	ｷｰ･ﾌｪﾙﾄ	
22225320	Escutcheon	ｴｽｶｯｼｮﾝ	
12359105	Rubber Foot	ｺﾞﾑ足	
22245447	Slide Pot Cover	ｽﾗｲﾄﾞ･ﾎﾞﾘｭｰﾑ･ｶﾊﾞｰ	
2224010200	Switch Mask	ｽｲｯﾁﾏｽｸ	
22465492	Heat Sink	ﾋｰﾄ･ｼﾝｸ	
22465497	Heat Sink	ﾋｰﾄ･ｼﾝｸ	
22195894	Jack Holder	ｼﾞｬｯｸﾎﾙﾀﾞ	
22195921	Bord Holder	ﾎﾞｰﾄﾞﾎﾙﾀﾞ	
22192837	DIN Holder	DIN ﾎﾙﾀﾞ	
22125565	Panel Angle	ﾊﾟﾈﾙｱﾝｸﾞﾙ	

PCB ASSY

7617506000	CPU-A Board	(pcb 22925394)	RD-300
7617506000	CPU-A Board	(pcb 22925394)	RD-200
7617512000	CPU-B Board	(pcb 22925348)	
7617517000	Switch Board	(pcb 22925393 1/2)	
7617514000	Effect Board	(pcb 22925392)	
7617504100	Primary Power Supply Board	(pcb 22925395) 100/117V	
7617504400	Primary Power Supply Board	(pcb 22925395) 220/240V	
7617533100	Secondary Power Supply Board	(pcb 22925353 1/2) 100/117V	RD-300
7617533400	Secondary Power Supply Board	(pcb 22925353 1/2) 220/240V	RD-300
7617709100	Secondary Power Supply Board	(pcb 22925353 1/2) 100/117V	RD-200
7617709400	Secondary Power Supply Board	(pcb 22925353 1/2) 220/240V	RD-200

KNOB, BUTTON

22485126	Knob	ﾂﾏﾐ	VOLUME, BRILLIANCE, TRE RATE/DEPTH
22485109	Knob	ﾂﾏﾐ	TUNE
22475651	Button blk	ﾎﾞﾀﾝ 黒	
22475652	Button gry	ﾎﾞﾀﾝ 灰	

JACK, SOCKET

13449146	YKB21-5012	jack	mono	DAMPER, SOFTR/REMOTE
13449145	YKB21-5010	jack	stereo	PHONES
13449252	YKB21-5006	jack	stero/w switch	OUTPUT L/R
13429615	TCS5350-01-1111	DIN triplet socket		MIDI IN/OUT/THRU

AC INLET

13429710	PA-126 2P	100/117/220V	
13429708	CM-3 3P	240V	

SWITCH

13149108	VVK2A443A	POWER
13169668	SKHHPM001	Switch board
13159322	HSW0372-01-520	LEVEL
13159137	SSSS21067A	TEST/NORM (CPU A board)

POWER TRANSFORMER

22455460U0	245-460U0	100/117/220/240V

AC CORD (DETACHABLE)

13439816F0	DC-320-J01	100V
13439812F0	UC-704-J01	117V
13439813F0	EC-210-J06	220V
23495110	5722-660-4606	240V-E
13439814F0	SC-415-J06	240V-A

FUSE, FUSE HOLDER

12559400	UL TSC 2A-N1	sec 100/117V	RD-300
12559397	UL TSC 800mA-N1	sec 100/117V	RD-200
12559514	CEE T2A	sec 220/240V	RD-300
12559509	CEE T315mA	sec 220/240V	RD-200
12559396	UL TSC 630mA-N1	pri 100/117V	RD-300
12559507	CEE T200mA	pri 220/240V	RD-200
12199550	H0446	Fuse Holder	

POTENTIOMETER

13359356	EVVA-NA0-x15A14	10KA x 2	VOLUME
13359353	EVVA-NA0-x15B14	10KB x 2	BRILLIANCE
13359455	EVVA-NFE-x15B14	10KB	EXT, LOWER/UPPER, VOLUME
13359356	EVVA-NA0-x15A15	100KB	TREMOLO RATE
13359356	EVVA-NA0-x15A14	10KA	TREMOLO DEPTH
13299177	RHEDA140XA	10KB	trimmer

IC

15179203	HD63B03PR	CPU	
15229830	MB63H149	gate array	CPU A BD IC10
15179343F0	MB8416A-12-SK-G	2Kx8 bit static RAM	CPU B BD IC13, 16
15179343	HM6116	2Kx8 bit static RAM	CPU B BD IC 12
15179734	MB7138H	bipolar plain output PROM	CPU B BD IC10
15179815	TM2764D-815 ROM A	2Kx8 bit EPROM	CPU A BD IC15
15179794	TM2764D-794 ROM B	2Kx8 bit EPROM	CPU B BD IC17
15179834	M5M2364-316P ROM C	2Kx8 bit mask ROM	CPU B BD IC11
or			
15179817	TMM2764D-817 ROM C	2Kx8 bit EPROM	CPU B BD IC11
15179810	TC531000P-7465	1Kx8 bit MASK ROM	CPU B BD IC7
15179811	TC531000P-7466	1Kx8 bit MASK ROM	CPU B BD IC6
15179812	TC531000P-7467	1Kx8 bit MASK ROM	CPU B BD IC5
15179813	TC531000P-7468	1Kx8 bit MASK ROM	CPU B BD IC18
15229837	MB60VH142PF-G-B	gate array R06-001	
15229838	MB60V141PF-G-B	gate array R06-002	
15229839	MB61V125PF-G	gate array R06-003	
15219162	PCM54HP	16-bit D/A converter	
15159503	TC40H000P	quad 2 input NAND gate	
15169301H0	HD74LS00P	quadruple 2-input positive NAND gate	
15159505	TC40H004P	hex inverter	
15159514	TC40H032P	quad 2 input OR gate	
15159506	TC40H038P	2 to 8 line decoder/demultiplexer	
15159511	TC40H174P	hex D-F/F	
15159530	TC40H367P	hex bus buffer	
15159508	TC40H373P	octal D-latch (3-state output)	
15159531	TC40H374P	ocatl D-F/F (3-state output)	
15159519	TC40H157P	quad 2 to 1 line selector/demultiplexer	
15169359X0	SN74LS541N	octal buffers and line drivers (3-sate output)	
15189158	μPC4082C	Op amp	
5189111J1	NJN-311D	Op amp	
15189189	μPC4570HA	OP amp	
15189148	NJM0072S	Op amp	
15189190	M5216L	Op amp	
15159115T0	TC4066BP	quadruple bilatch switch	
15219174	NJU201AD	quad spst analog switch	
15199106NH	μPC7805H	+5V regulator	
15199117	M5230L	regulator	
15169334H0	HD74LS05	hex inverter w/open collector output	
15159303T0	TC4584BP	hex shimitt trigger	
15219163	NE572	programmable analog compander	
15219179	M5206P	dual voltage controlled amp	
15219205	MN3007	1024-stage BBD	
15169504	MN3101	BBD driver	
15229706S0	PC-910	optoisolator	

TRANSISTOR

15119134	2SA933S	
15119184	2SB1015-0	
15129153	2SC1740S	
15129152	2SC2878A	
15129834	2SD1408-0	
15119139	DTA144E	w/built-in bias resistors
15129168	DTC124E	w/built-in bias resistors
15139123	2SK184	
15139121	2SK117-GR	FET
15139124	2SK363	FET

DIODE

15019152T0	1SS176	
15019103T0	1S2473	
15029152	GL-9HD12	LED red
15019273	4B4B41-LC1	
15019272	4B4B41-LC2	
15019208	1SR35-200	
15019412	MTZ4.7B	zener

RESISTOR ARRAY

13919153	RMLS5-103J	10K x 5
13919310	RMLS8-103J	10K x 8
13919311	RMLS8-223J	22K x 8
13919305	RMLS4-472J	4.7K X 4
13919147	RMLS4-103J	10K x 4
13919308	RMLS6-103J	10K x 6
13919334	RMLS10-153J	15K x 10
13919333	RMLS12-153J	15K x 12
13919313	RMLS8-104J	100K x 8
13919118	RGSD16L104G	ladder resistor

CAPACITOR

13659201	ECET16R682SW	6800 μF/16V	electro
13659222M0	ECET354222SW	2200 μF/35V	electro
13529104	DE7150F472MVA1	0.0047 μF	line bypass

CAPACITOR ARRAY

13529118	B54C0139-32N	22PF x 4
13529113	B7ZC0724-32N	22PF x 6
13529115	EXFP8101MN	100PF x 8

CRYSTAL

12389747	HC-49/U	16MHz
12389751	HC-49/U	12.8MHz

COLLAR/BUSHING

12159715	TB-300	male	メス
12159713	TA-305P	female	メス
12159733	TA-310	female	メス

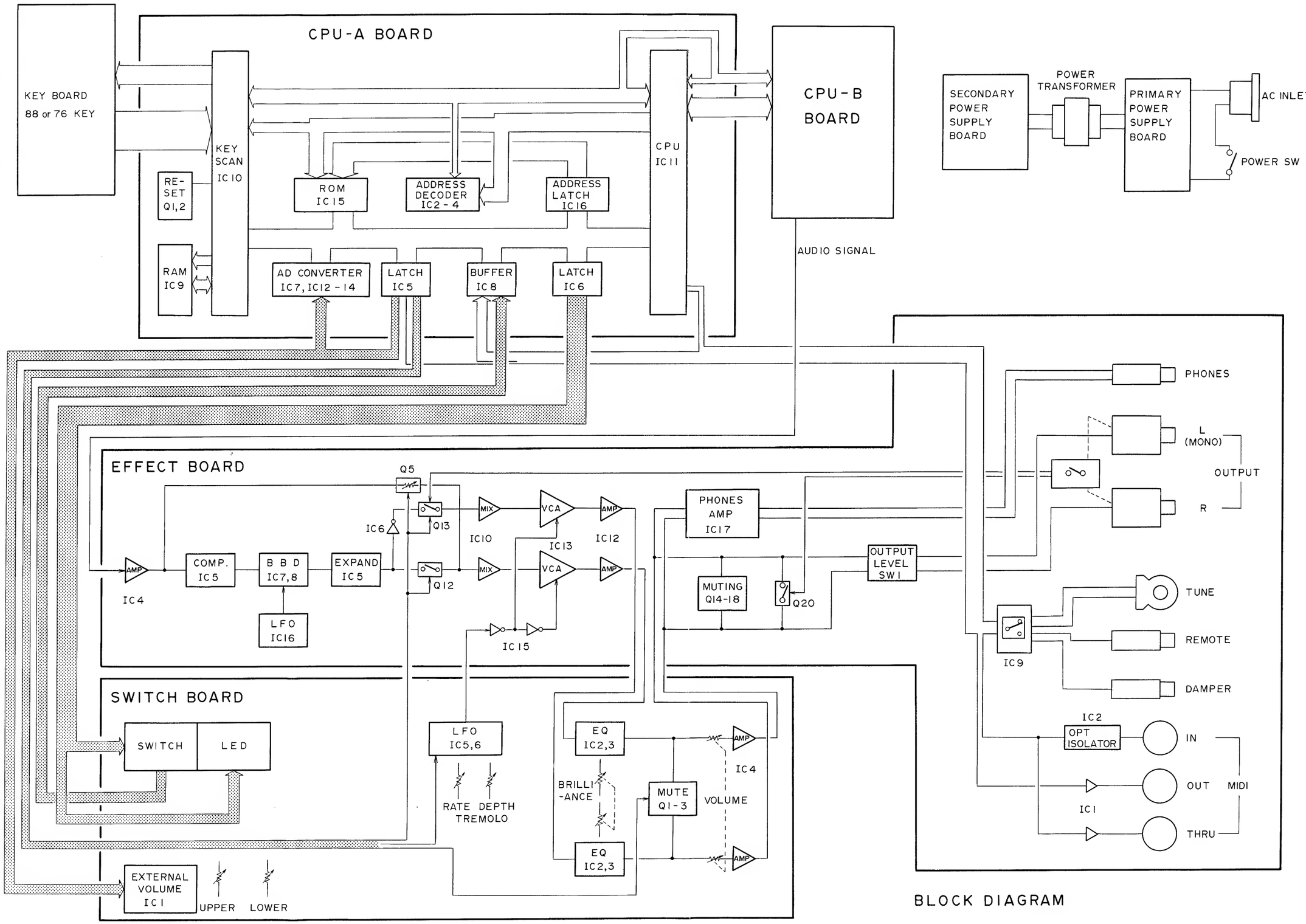
ROTARY ENCODER

13279291	EVQ-VVKF1531G	TUNE

OTHERS

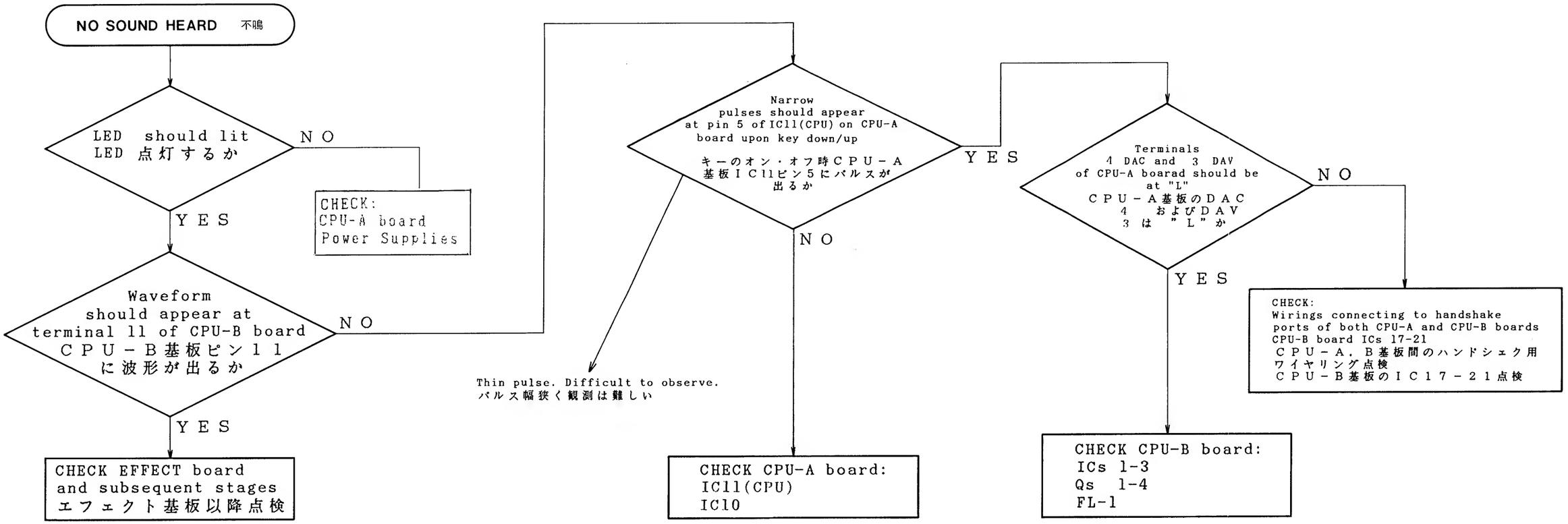
22445240	BL02RN2-R62	ferrite bead
12449269	0538-014	low pass filter

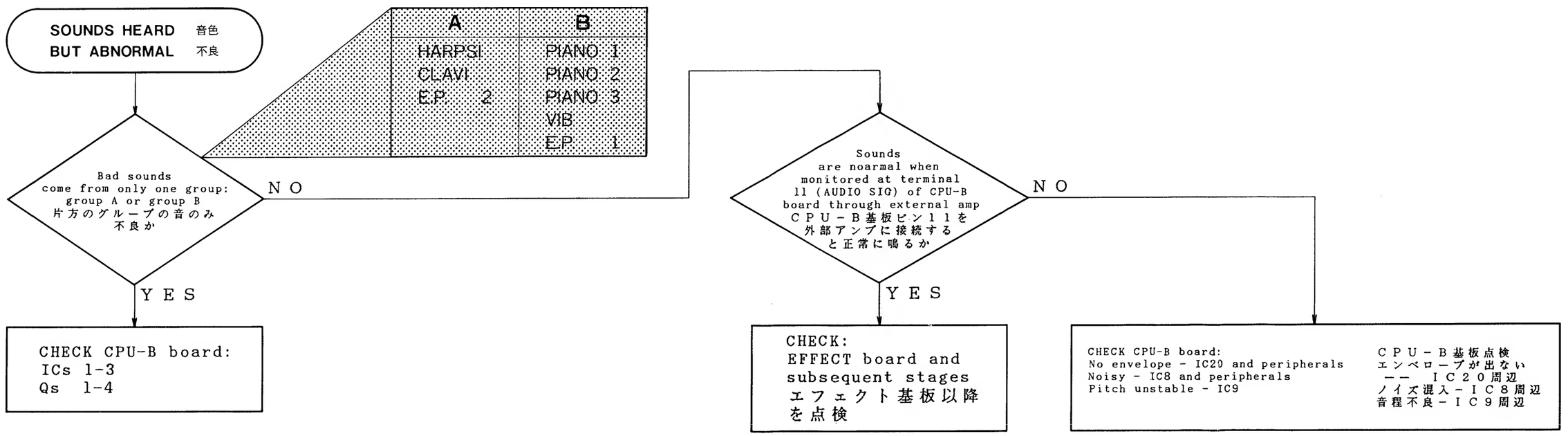
BLOCK DIAGRAM



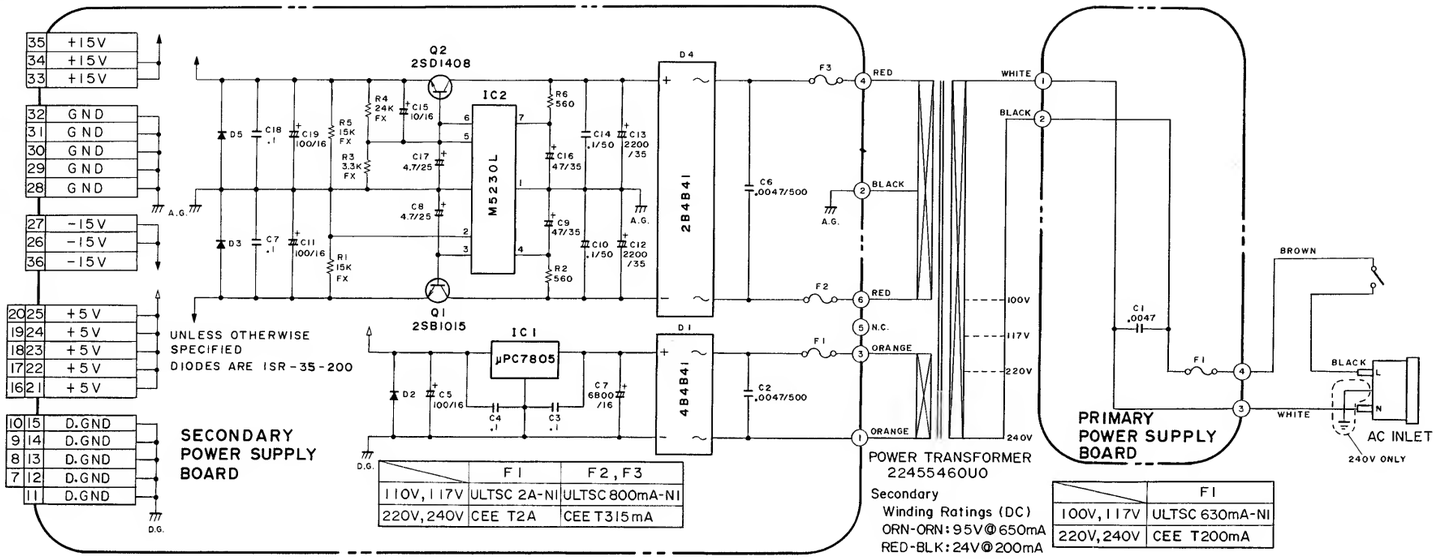
BLOCK DIAGRAM

TROUBLESHOOTING Logic Tree　トラブルシューティング・ガイド





CIRCUIT DIAGRAM

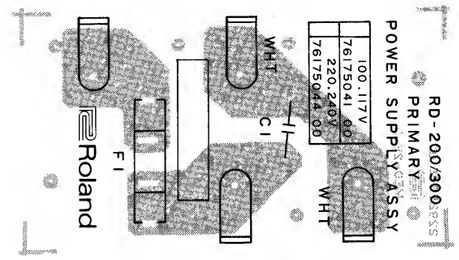


	F1	F2, F3
110V, 117V	ULTSC 2A-N1	ULTSC 800mA-N1
220V, 240V	CEE T2A	CEE T315mA

	F1
100V, 117V	ULTSC 630mA-N1
220V, 240V	CEE T200mA

PRIMARY POWER SUPPLY BOARD

7617504100 100/117V
7617504400 220/240V



Secondary Power Supply board of one model (RD-200 or RD-300) can be a replacement for the other by reusing the existing heat sink on the PCB to be replaced.

CAUTION
Do not attempt to remove the heat sink installed on RD-300 . . . . . difficult to reinstall by one person.

互換性について

ＲＤ-200用、ＲＤ-300用２次電源基板間の相異点はヒートシンクのみです。
補修用基板はヒートシンク付ですので不用な場合は取り外して下さい。

注 意
ＲＤ-300上のヒートシンクは一旦はずすと再取付が非常に困難です(１人では)。補修用基板上のヒートシンクをはずしてから使用して下さい。

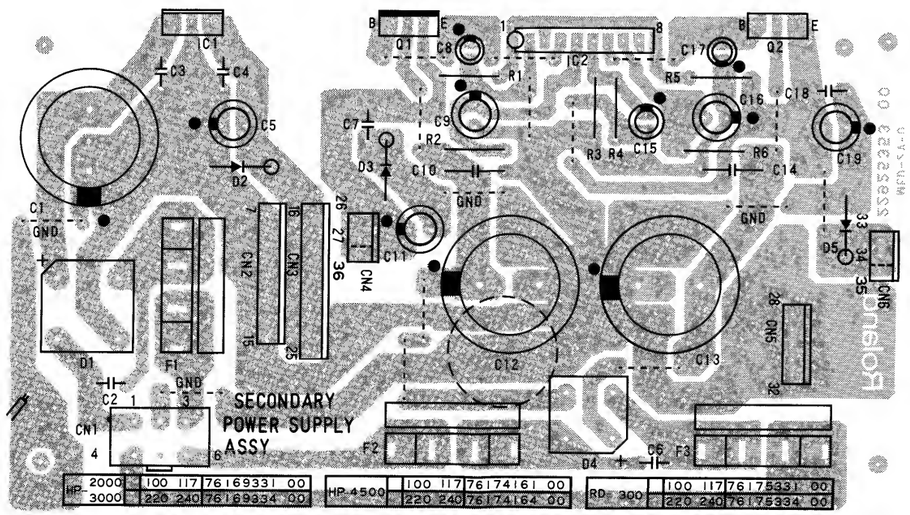
Secondary Power Supply board employed on the models shown in table 1 are fasically the same except for wiring, heat sink or fuses.
Therefore, one pcb could be used for all models or voltage versions if:
In-system wiring and heat sink are reused and/or fuses are replaced with correct ones.

本基板は下記機種にも用いられており、基本的には同じものです。従って現用のワイヤリング、ヒートシンクを再使用し、かつヒューズを適切な値にすれば５機種および全電圧に共通使用可能となります。

SECONDARY POWER SUPPLY BOARD

7617533100 100/117V RD-300
7617533400 220/240V RD-300
(pcb 22925353)

7617709100 100/117V RD-200
7617709400 220/240V RD-200
(pcb 22925353)



= Common

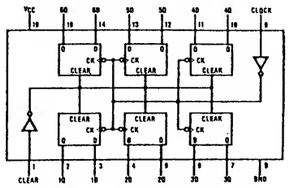
Table1

MODEL	VOLTAGE		F1	F2, F3	HEAT SINK	WIRING	ASSY No.
RD-200	100/117V	FUSE	ULTSC 2A-N1	ULTSC 800mA-N1			7617709100
		LABEL	H224 2.0A125V	H220 T800mA/125V			
	220/240V	FUSE	CEE T2A	CEE T315mA			7617709400
		LABEL	#408 T2A/250V	#400 T315mA/250V			
RD-300	100/117V	FUSE	ULTSC 2A-N1	ULTSC 800mA-N1			7617533100
		LABEL	H224 2.0A125V	H200 T800mA/125V			
	220/240V	FUSE	CEE T2A	CEE T315mA			7617533400
		LABEL	#408 T2A/250V	#400 T315mA/250V			
HP-2000 HP-3000	100/117V	FUSE	ULTSC 2A-N1	ULTSC 1.25A-N1			7616933100
		LABEL	H224 2.0A125V	H222 1.25A125V			
	220/240V	FUSE	CEE T2A	CEE T500mA			7616933400
		LABEL	#408 T2A/250V	#402 T500mA/250V			
HP-4500	100/117V	FUSE	ULTSC 2A-N1	ULTSC 1.25A-N1			7617416100
		LABEL	H224 2.0A125V	H222 1.25A125V			
	220/240V	FUSE	CEE T2A	CEE T500mA			7617416400
		LABEL	#408 T2A/250V	#402 T500mA/250V			

IC DATA

TC40H174P Hex D Flip-Flops with Clear

Pin Configuration

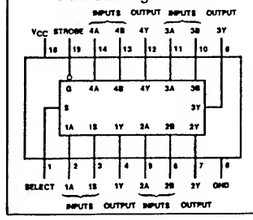


Truth Table

Inputs			Outputs
Clear	Clock	D	Q
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q_0

TC40H157P Quad 2-Input Multiplexer

Pin Configuration

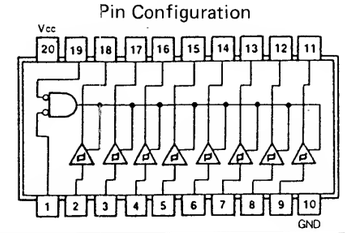


Truth Table

Inputs				Output Y
Strobe	Select	A	B	HC157
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

SN74LS541N Octal 3-State Buffer

Pin Configuration

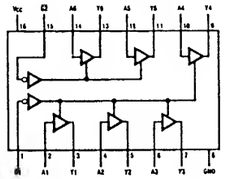


Truth Table

Inputs		Outputs
E_1	E_2	
L	L	D
H	X	High-Z
X	H	

TC40H367P Hex 3 STATE Buffer

Pin Configuration

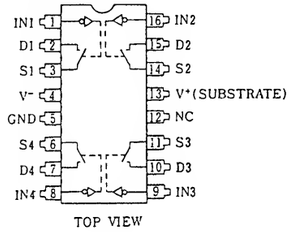


Truth Table

Inputs		Output
$\overline{G}$	A	Y
H	X	Z
L	H	H
L	L	L

HI-201

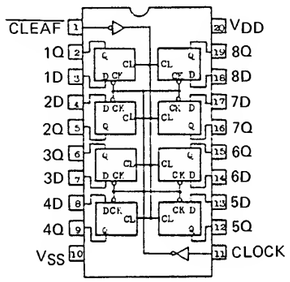
Pin Configuration



TC40H273P OCTAL D-TYPE FLIP-FLOP

Pin Configuration

Top View



Truth Table

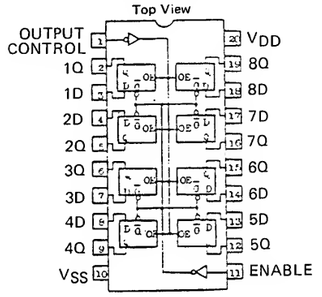
INPUTS			OUTPUT
CLEAR	CLOCK	DATA	Q
L	※	※	L
H	↑	H	H
H	↑	L	L
H	L	※	Q_0

※ = Don't Care

TC40H373P OCTAL D-TYPE LATCH (3-STATE OUTPUT)

Pin Configuration

Top View



Truth Table

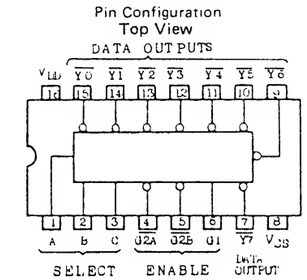
INPUTS			OUTPUT
OUTPUT CONTROL	ENABLE G	DATA	Q
L	H	H	H
L	H	L	L
L	L	※	Q_0
H	※	※	High Impedance

※ = Don't care

TC40H138P 3-TO-8-LINE DECODER/DEMULTIPLEXER

Pin Configuration

Top View

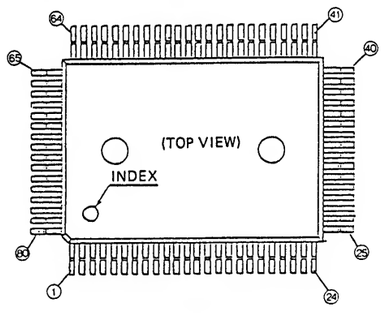


Truth Table

INPUTS						OUTPUTS							
ENABLE			SELECT										
G1	$\overline{G2A}$	$\overline{G2B}$	A	B	C	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$
L	※	※	※	※	※	H	H	H	H	H	H	H	H
※	H	※	※	※	※	H	H	H	H	H	H	H	H
※	※	H	※	※	※	H	H	H	H	H	H	H	H
H	L	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	H	L	L	H	L	H	H	H	H	H	H
H	L	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	L	H	H	H	L	H	H	H	H
H	L	L	L	L	H	H	H	H	H	L	H	H	H
H	L	L	H	L	H	H	H	H	H	H	L	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L

※ : Don't care

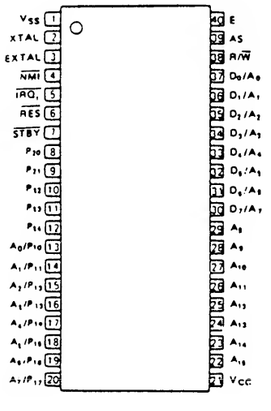
MB63H149 Pin Assignment



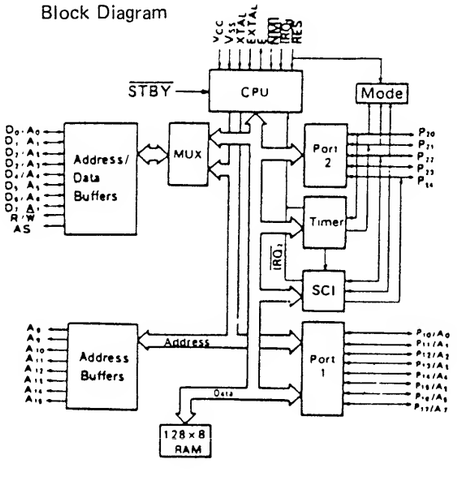
Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name	Pin no.	I/O	Pin name
1	O	T7	21	I	BR9	41	I/O	CD7	61	O	RA1
2	I	BR0	22	I	MK9	42	I	CA8	62	O	RA10
3	I	MK0	23	I	BR10	43	I	CA9	63	O	RA2
4	I	BR1	24	I	MK10	44	I	CA10	64	I/O	ROE
5	I	MK1	25	I	RES	45	I	CS	65	O	RA3
6	I	BR2	26	I/O	EXCK	46	I	XT1	66	O	RWE
7	I	MK2	27	I	E	47	O	XT2	67	O	RA4
8	I	BR3	28	O	INT	48	O	ASEL	68	O	RA9
9	I	MK3	29	I	AS	49	I	MOD1	69	O	RA5
10	I	BR4	30	O	CRES	50	I	MOD2	70	O	RA8
11	I	MK4	31	I	CRNW	51	I/O	RD3	71	O	RA6
12	-	VSS	32	O	SRCK	52	-	VSS	72	O	RA7
13	I	BR5	33	-	VDD	53	I/O	RD4	73	-	VDD
14	I	MK5	34	I/O	CDO	54	I/O	RD2	74	O	TO
15	I	BR6	35	I/O	CD1	55	I/O	RD5	75	O	T1
16	I	MK6	36	I/O	CD2	56	I/O	RD1	76	O	T2
17	I	BR7	37	I/O	CD3	57	I/O	RD6	77	O	T3
18	I	MK7	38	I/O	CD4	58	I/O	RD0	78	O	T4
19	I	BR8	39	I/O	CD5	59	I/O	RD7	79	O	T5
20	I	MK8	40	I/O	CD6	60	O	RA0	80	O	T6

HD63B03RP

Pin Configuration (Top View)

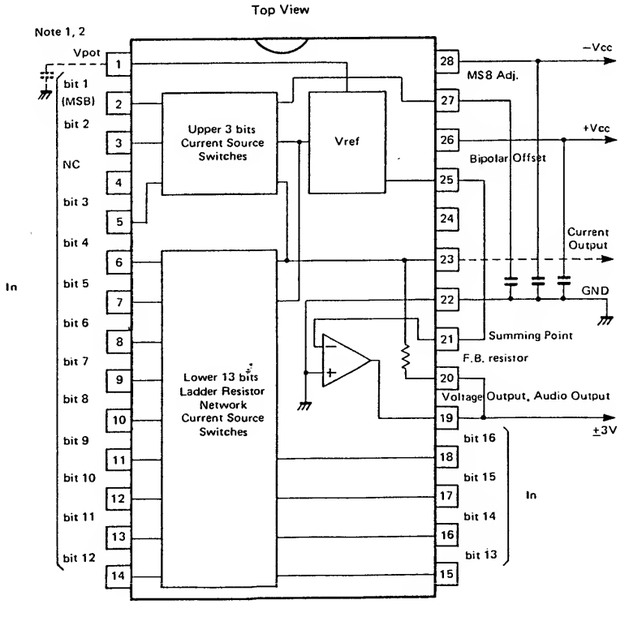


Block Diagram



PCM-54

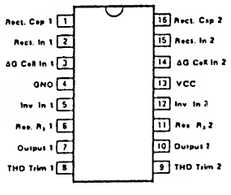
Top View



NE572

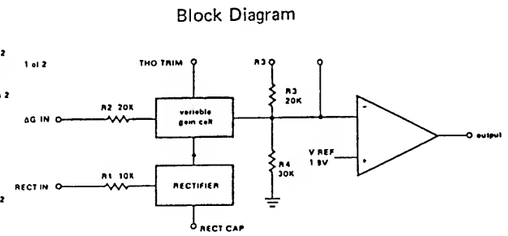
Pin Configuration

D', F, N PACKAGE

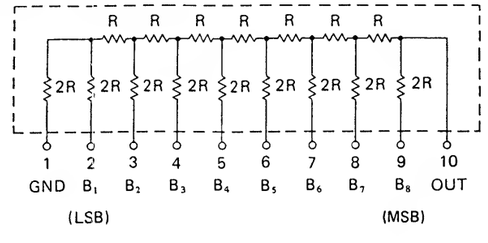


Top View

Block Diagram

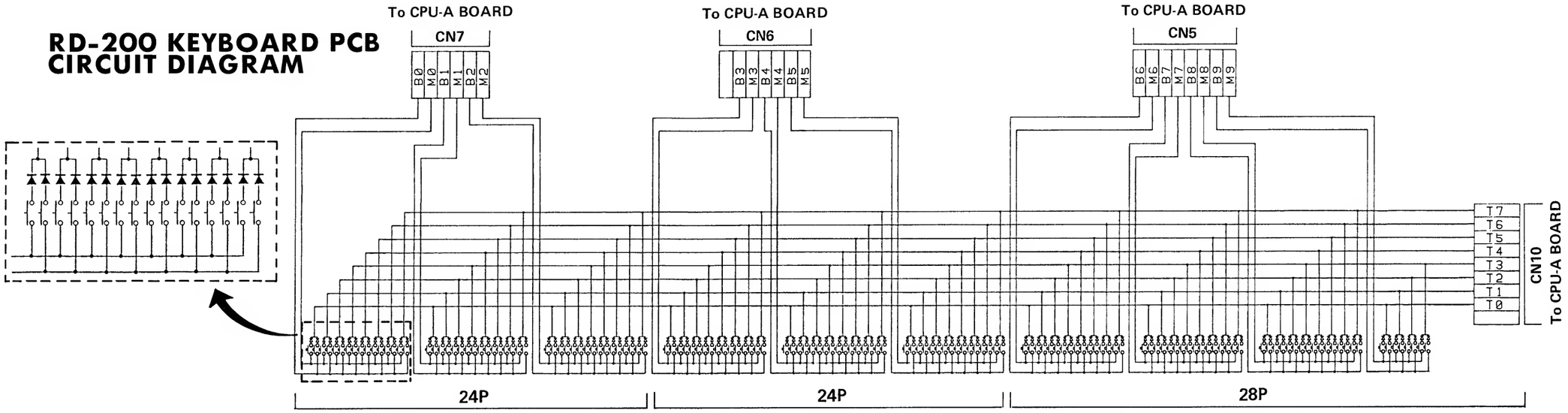


Ladder Network RGSD16L104G



R = 100KΩ
2R = 200KΩ

RD-200 KEYBOARD PCB CIRCUIT DIAGRAM



SK-4 SWITCH PUB (LOW)

7615222000
(pcb 22925163-01)

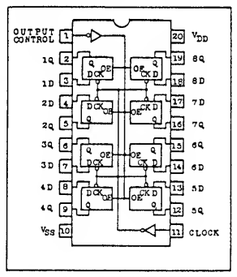
SK-4 SWITCH PCB (MID)

7615223000
(pcb 22925163-01)

SK-4 SWITCH PCB (HI)

7615224000
(pcb 22925162)

TC40H374P
OCTAL D-TYPE FLIP-FLOP(3-STATE OUTPUT)

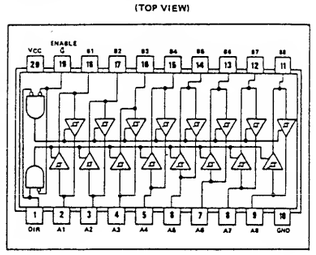


Truth Table

INPUTS			OUTPUT
OUTPUT CONTROL	CLOCK	DATA	Q
L	↑	H	H
L	↑	L	L
L	↓	※	Qo
H	※	※	High Impedance

※ Don't care

SN74LS245
OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS
(TOP VIEW)

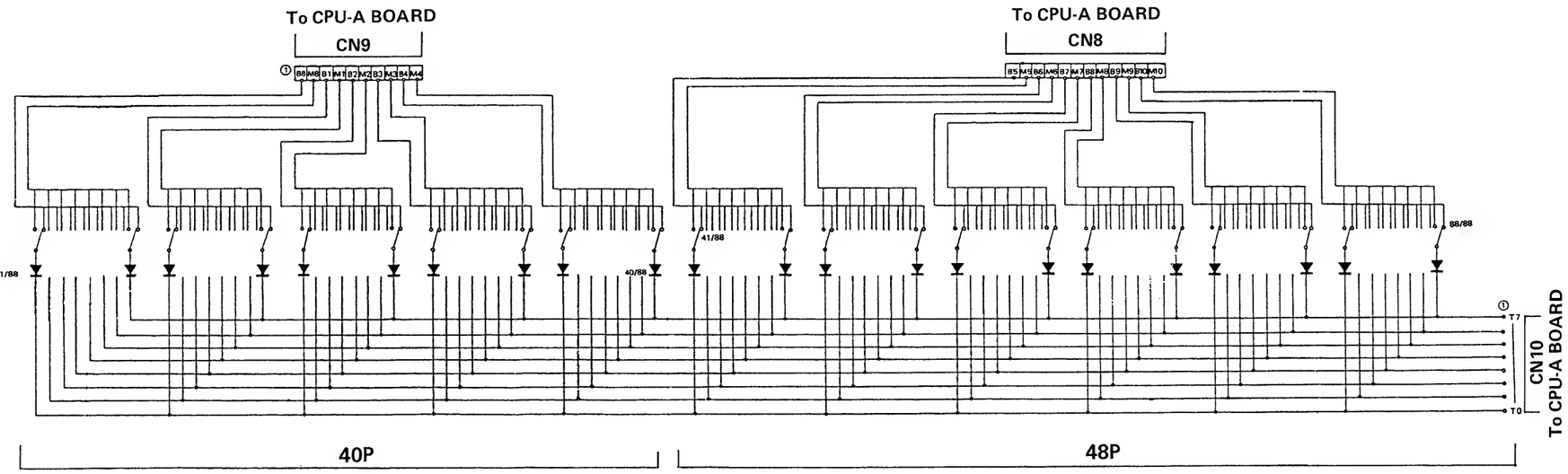


FUNCTION TABLE

ENABLE $\overline{G}$	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H = high level, L = low level, X = irrelevant

RD-300 KEYBOARD PCB CIRCUIT DIAGRAM



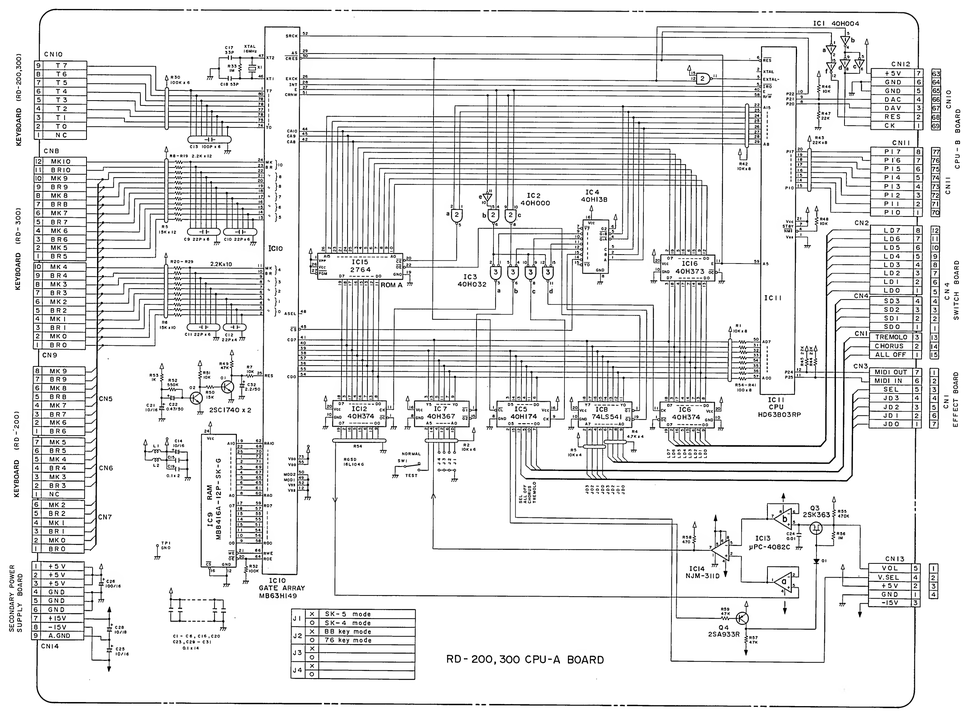
SK-5 MATRIX BOARD 40P

23164655

SK-5 MATRIX BOARD 48P

23165648

CIRCUIT DIAGRAM

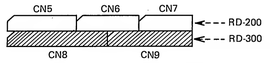


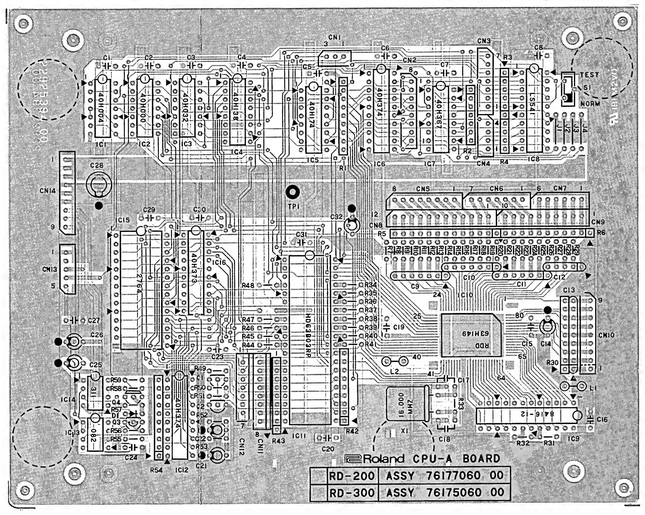
CPU-A BOARD

7617506000 RD-300
7617706000 RD-200
(pcb 22925394)

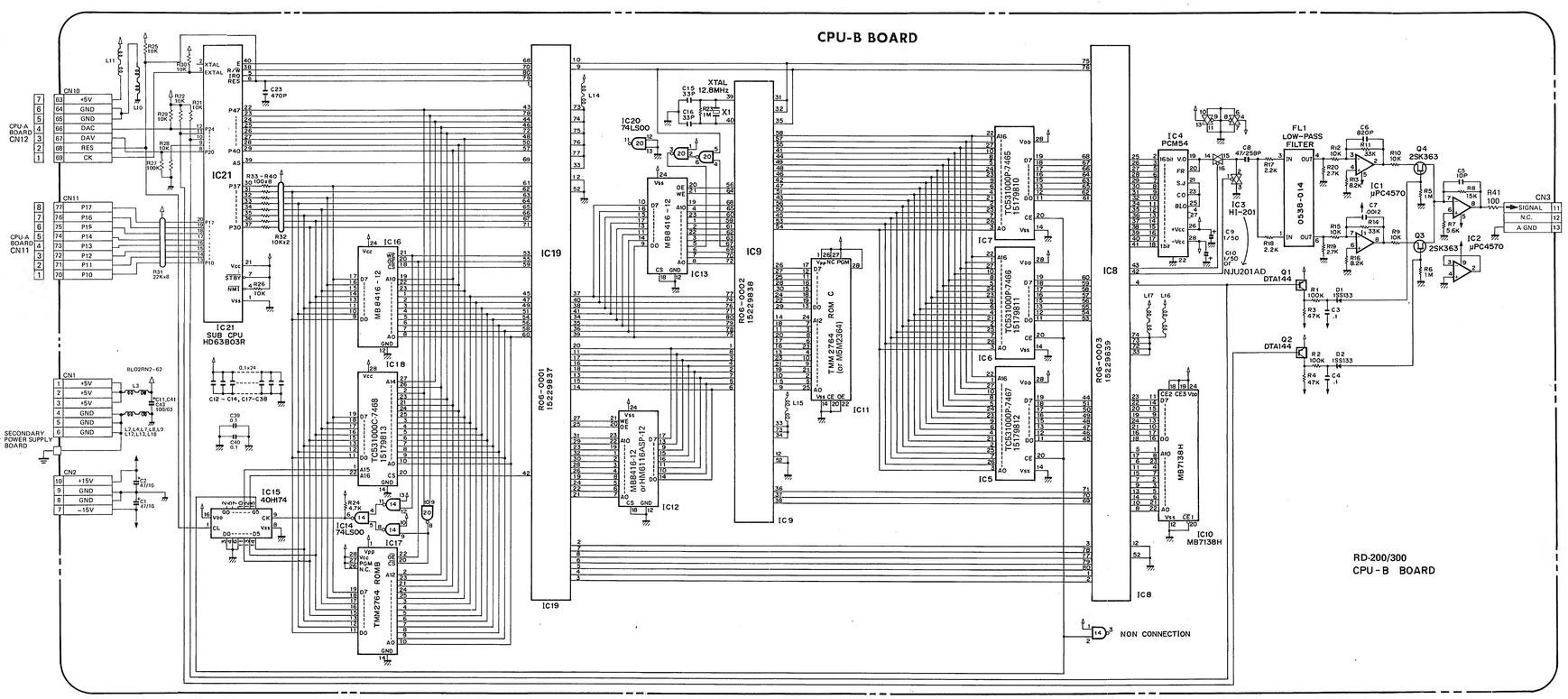
Two versions are the same except for connector arrangement for different keyboards as shown below.
By adding connectors as necessary, either version can be used as a replacement for the other.

機種間の基板の違いは下記の通りコネクタの位置、数だけです。この点に留意すれば両基板間には互換性が有ります。



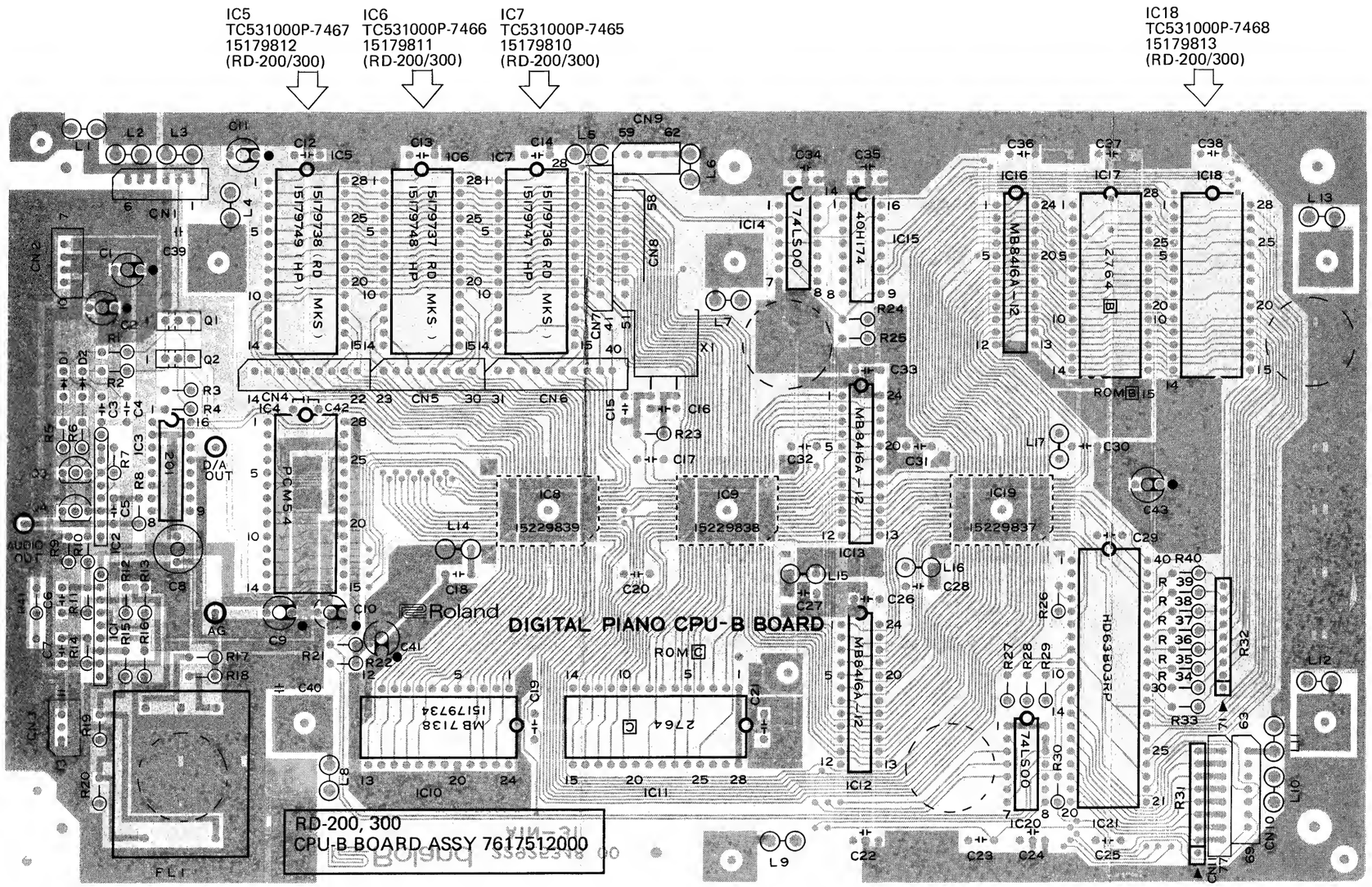


CIRCUIT DIAGRAM



CPU-B BOARD

7617512000
(pcb 22925348)



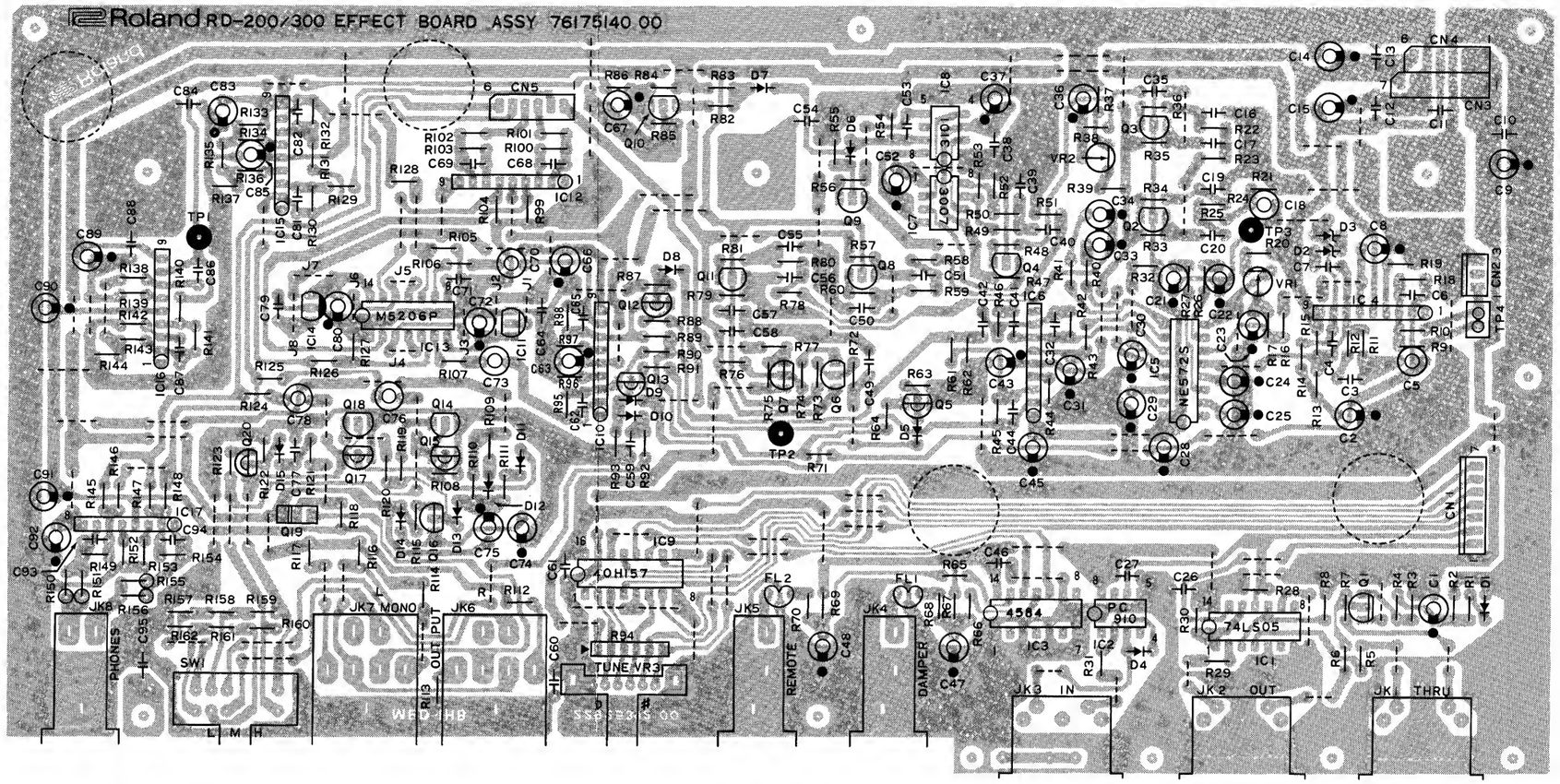
* ROM-B or ROM-C on the CPU-B board is compatible with those of some other models shown in the table 1.

＊ＣＰＵ-Ｂ基板上のＲＯＭ-Ｂ、ＲＯＭ-Ｃについては表１の様に他機種のあるバージョンとだけ互換性が有ります。

Table1

ROM-B (CPU-B board IC17)	●HP-2000/3000/4500/5500/5600 Ver 3.0 (15179794) ●HP-2000/3000/4500 Ver 1.0 (15179794) ●HP-5500/5600 Ver 3.0 (15179771-02)	Compatible 互換性有	●RD-200/300 Ver 3.00 (15179794)
ROM-C (CPU-B board IC11)	●RD-1000, MKS-20 HP-5500/5600 Ver 1.0 (15179744) ●HP-2000/3000/4500/5500/5600 Ver 1.0 (15179817)	Compatible 互換性有	●RD-200/300 Ver 1.00 (15179817) EP ROM or (15179834) Mask ROM

EFFECT BOARD
7617514000
(pcb 22925392)



SWITCH BOARD
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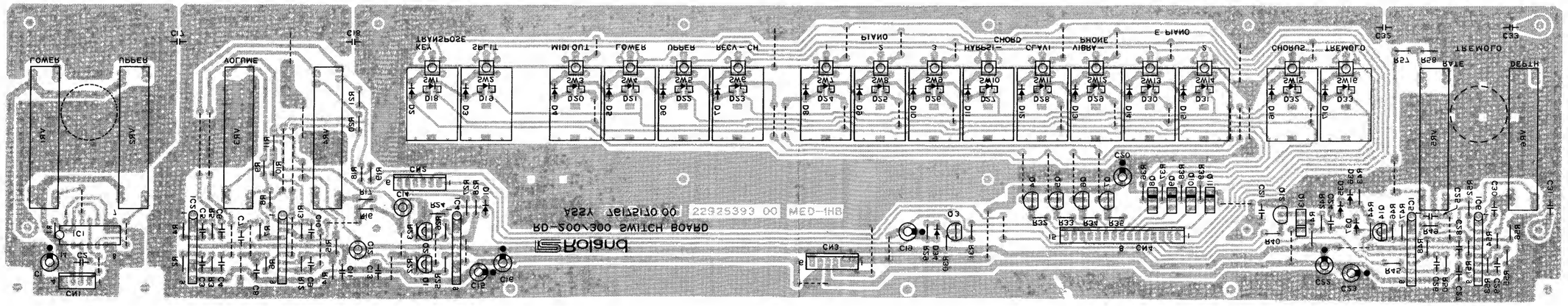
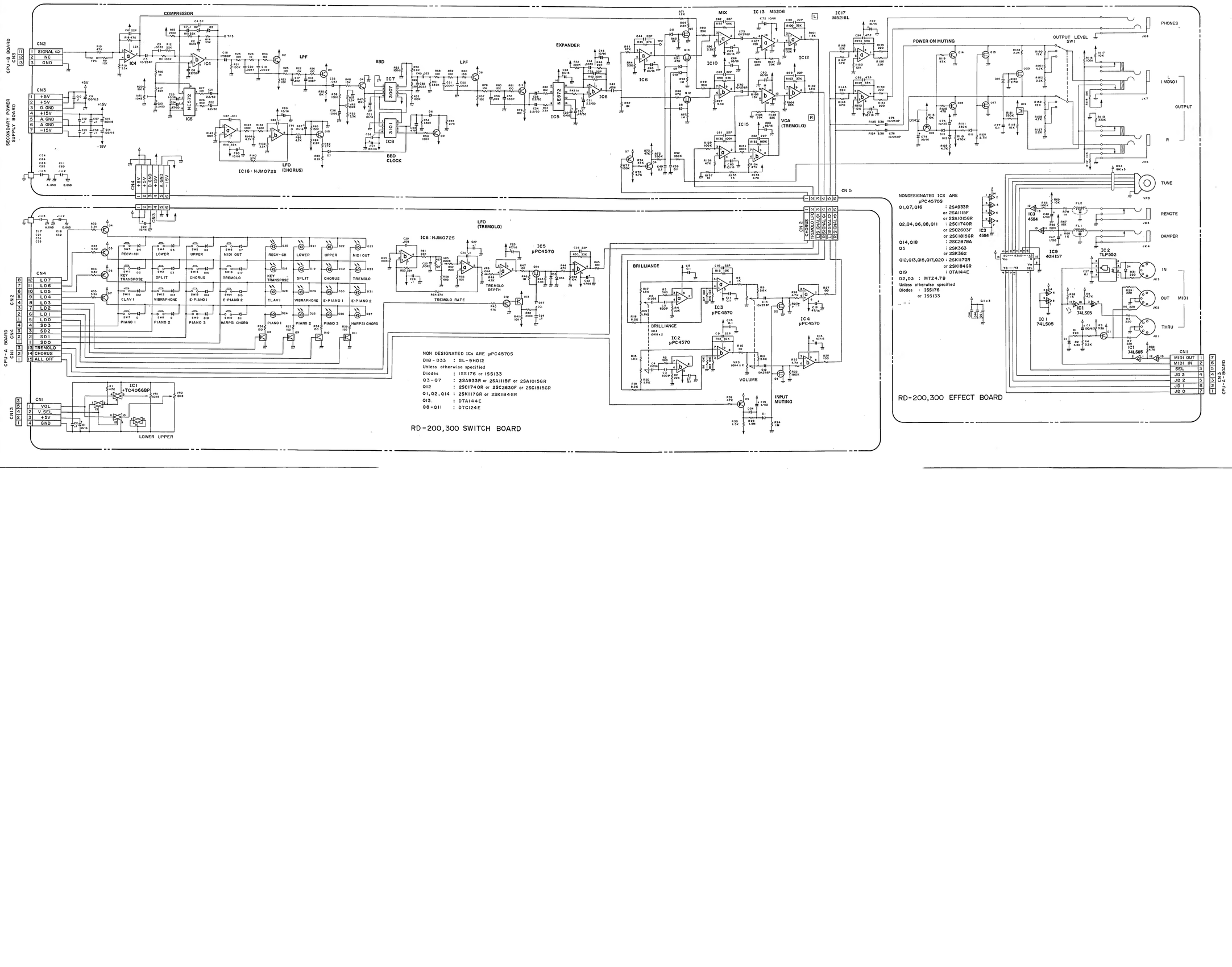
(pcb 22925393)



CIRCUIT DIAGRAM



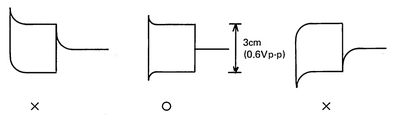
ADJUSTMENT

TEST MODE

The RD-200 and 300 have the test program built in.
To run the program, turn off the power, place SW-1 of the CPU-A board at TEST then re-apply the power while holding CHORUS button.

1. COMPRESSOR –Effect Board–

1-1. Connect an oscilloscope (scope) to TP-3. Set scope to 0.2V/div, 50ms/div with AC coupling input mode.
1-2. Press TREMOLO.
1-3. Adjust VR1 for drift-free waveform as shown in the figure below.



2. BBD BIAS –Effect Board–

2-1. Press CHORUS.
2-2. Connect scope to TP-2. Set scope to 0.2V/div, 0.2ms/div with DC coupling.
2-3. Short the two pins on TP-4.
2-4. Adjust VR2 for a maximum amplitude.
2-5. Turn the power off to exit the test mode.
2-6. Open TP-4 pins.

調整

テストモード

RD-200/300には調整用のプログラムが内蔵されています。

- CPU-A基板のSW-1をTEST側にする。
- CHORUSボタンを押しながら電源をオンにする。

1. コンプレッサ —エフェクト基板

1-1. TP-3にシンクロスコープを接続する。(0.2V/div, 50mS/div, AC)
1-2. TREMOLOを押す。
1-3. 波形が下図の様になるようにVR-1を調整する。

2. BBDバイアス —エフェクト基板

2-1. CHORUSを押す。
TP-2にシンクロスコープを接続する。
2-2. (0.2V/div, 0.2mS/div, DC)
2-3. TP-4のピンをショートする。
2-4. 波形の振幅が最大になるようにVR-2を調整する。

Digital piano

MODEL RD-200/300 MIDI Implementation Chart

Date : Aug. 20, 1986
Version : 1.0

Function.....		Transmitted	Recognized	Remarks
Basic Channel	Default	1,2	1	
	Changed	1–16	1–16	
Mode	Default	3	1	
	Messages	POLY,OMNI OFF	POLY, OMNI ON/OFF	
	Altered	**********	MONO(M ≠ 1)→1, (M=1)→3	
Note Number	True voice	15–113(RD-300),22–108(RD-200)	0–127	
		**********	15–113	
Velocity	Note ON	○	○	v=1–127
	Note OFF	× (9n v=0)	×	
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bender		×	×	
Control	7	○	×	Volume
	64	○	○	Hold 1
	66	○	○	Sostenuto
	67	○	○	Soft pedal
	92	○	○	Tremolo
	93	○	○	Chorus
Prog Change	True #	○ (0–127)	○(0–31)	can be ignored by power-up setting
		**********	0–31	
System Exclusive		×	×	
System Common	Song Pos	×	×	
	Song Sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Mes-sages	Local ON OFF	×	×	
	All Notes OFF	○	○ (123–127)	
	Active Sense	○	○	
	Reset	×	×	
Notes		When power up, ch–1 OMNI OFF and POLY are sent. When Basic channel is changed, Mode is set to 3.		

Mode 1 : OMNI ON, POLY　　Mode 2 : OMNI ON, MONO　　○ : Yes
Mode 3 : OMNI OFF, POLY　　Mode 4 : OMNI OFF, MONO　　× : No

Digital piano

MODEL RD-200/300 MIDI Implementation

Date : Aug. 20, 1986
Version : 1.0

1. TRANSMITTED DATA

Status	Second	Third	Description	
1001 nnnn	0kkk kkkk	0000 0000	Note OFF	
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 15 – 113 RD-300 22 – 108 RD-200 vvvvvvv = 1 – 127	*1
1011 nnnn	0000 0111	0vvv vvvv	Volume vvvvvvv = 0 – 127	*6
1011 nnnn	0100 0000	0111 1111	Hold1 ON	
1011 nnnn	0100 0000	0000 0000	Hold1 OFF	
1011 nnnn	0100 0010	0111 1111	Sostenuto ON	*2
1011 nnnn	0100 0010	0000 0000	Sostenuto OFF	
1011 nnnn	0100 0011	0111 1111	Soft ON	*2
1011 nnnn	0100 0011	0000 0000	Soft OFF	
1011 nnnn	0101 1100	0111 1111	Tremolo ON	*3
1011 nnnn	0101 1100	0000 0000	Tremolo OFF	*3
1011 nnnn	0101 1101	0111 1111	Chorus ON	*3
1011 nnnn	0101 1101	0000 0000	Chorus OFF	*3
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 – 127	*4
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	*5
1011 nnnn	0111 1100	0000 0000	OMNI OFF	*6
1011 nnnn	0111 1101	0000 0000	POLY ON	*6
1111 1110			Active Sensing	

Notes :
nnnn : MIDI Channel number (0000 – 1111), ch–1 = 0000
The Basic Transmit Channel can be changed by panel operation.
Refer to 3. BASIC CHANNEL IN TRANSMITTING.

Lower and Upper are both enable,
when the power has been applied.
Each of Lower and Upper can be set to enable
or set to disable by panel operation.

*1 The range can be changed by panel operation.
Refer to 5. KEY TRANSPOSE.

*2 If the power has been applied with the Soft pedal being trodden, Soft pedal is regarded as Sostenuto pedal.

*3 Refer to 6. TREMOLO, CHORUS IN TRANSMITTING.

*4 Refer to 7. PROGRAM CHANGE IN TRANSMITTING.

*5 When all held-keys on the keyboard are released, the ALL NOTES OFF (No 7B 0) is sent.

*6 When the power is first applied, following messages are transmitted.
a. OMNI OFF, POLY ON message for Lower and Upper Basic Channel.
b. LOWER Volume data (B1 07 VV) for Lower Basic Channel.
c. UPPER Volume data (B0 07 VV) for Upper Basic Channel.

2. RECOGNIZED RECEIVE DATA

Status	Second	Third	Description	
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF, velocity ignored	
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 0 – 127 (15 – 113)	*1
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 0 – 127 (15 – 113) vvvvvvv = 1 – 127	*1
1011 nnnn	0100 0000	0vvv vvvv	Hold1 OFF vvvvvvv = 0 – 63 Hold1 ON vvvvvvv = 64 – 127	
1011 nnnn	0100 0010	0vvv vvvv	Sostenuto OFF vvvvvvv = 0 – 63 Sostenuto ON vvvvvvv = 64 – 127	
1011 nnnn	0100 0011	0vvv vvvv	Soft OFF vvvvvvv = 0 – 63 Soft ON vvvvvvv = 64 – 127	
1011 nnnn	0101 1100	0vvv vvvv	Tremolo OFF vvvvvvv = 0 – 63 *2 Tremolo ON vvvvvvv = 64 – 127 *2	
1011 nnnn	0101 1101	0vvv vvvv	Chorus OFF vvvvvvv = 0 – 63 *2 Chorus ON vvvvvvv = 64 – 127 *2	
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 – 31	*3
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	*4
1011 nnnn	0111 1100	0000 0000	OMNI OFF	*5
1011 nnnn	0111 1101	0000 0000	OMNI ON	*5
1011 nnnn	0111 1110	0000 nnnn	MONO ON	*5
1011 nnnn	0111 1111	0000 0000	POLY ON	*5
1111 1110			Active Sensing	

Notes :
nnnn : MIDI Channel number (0000 – 1111), ch–1 = 0000
The Basic Channel can be changed by panel operation.
Refer to 4. BASIC CHANNEL IN RECEIVING.

*1 Note numbers outside of the range 15 – 113 are transposed to the nearest octave inside this range.
The Key Transpose operation from the panel does not affect MIDI IN NOTE numbers

*2 If the power has been applied with the PIANO 1 switch being held down, this message is ignored.

*3 Refer to 8. PROGRAM CHANGE IN RECEIVING.

*4 When the ALL NOTES OFF is recognized, all MIDI-on notes are turned OFF. However, if the damper pedal is being pressed, these ON notes will not be turned OFF until the damper pedal is released. Similarly, if the MIDI Hold1 ON message has been received, the notes will not be turned off until the Hold1 OFF message is received.

*5 These Mode Messages (2nd byte = 123 – 127) are also recognized as the ALL NOTES OFF.

Mode Messages are recognized as follows:

	: POLY ON (127)	: MONO ON (126)	: MONO ON (126)
	:	: mmm = 1	: mmm = 3 – 1
OMNI OFF (124)	: OMNI = OFF : POLY	: OMNI = OFF : POLY	: OMNI = ON : POLY
OMNI ON (125)	: OMNI = ON : POLY	: OMNI = ON : POLY	: OMNI = ON : POLY

3. BASIC CHANNEL IN TRANSMITTING

When the power is first applied, the Lower Basic Channel is normally set to 2, and Upper Basic Channel is normally set to 1.

However, the Basic Channel may be changed when the following key on the keyboard is pressed while the Lower (or Upper) PROGRAM CHANGE switch being held down. Lower and Upper can not be set at same channel.

Key	Basic Channel
A 0	1
A# 0	2
B 0	3
C 1	4
C# 1	5
D 1	6
D# 1	7
E 1	8
F 1	9
F# 1	10
G 1	11
G# 1	12
A 1	13
A# 1	14
B 1	15
C 2	16

When Lower(or Upper) Basic Channel is changed, following message are transmitted.

In the previous Basic Channel.
a. Hold1 OFF (If Damper pedal is trodden.)
b. Sostenuto OFF (If Sostenuto pedal is trodden.)
c. Soft OFF (If Soft pedal is trodden.)
when set to MIDI OUT OFF by panel operation, these messages are not sent.

In the new Basic Channel.
a. OMNI OFF
b. POLY ON
c. Velocity
d. Hold1 ON (If Damper pedal is trodden)
e. Sostenuto ON (If Sostenuto pedal is trodden)
f. Soft ON (If Soft pedal is trodden)
when set to MIDI OUT OFF by panel operation, c,d,e and f messages are not sent.

4. BASIC CHANNEL IN RECEIVING

When the power is first applied, the Basic Channel is normally set to 1, and the receiver is set to the MODE 1 (OMNI ON, POLY).

However, the Basic Channel may be changed when the following key on the keyboard is pressed while the RECEIVE-CH switch being held down.
The receiver will be set to the MODE 3 (OMNI OFF, POLY).

Key	Basic Channel	OMNI
Power-up	1	ON
A 0	1	OFF
A# 0	2	OFF
B 0	3	OFF
C 1	4	OFF
C# 1	5	OFF
D 1	6	OFF
D# 1	7	OFF
E 1	8	OFF
F 1	9	OFF
F# 1	10	OFF
G 1	11	OFF
G# 1	12	OFF
A 1	13	OFF
A# 1	14	OFF
B 1	15	OFF
C 2	16	OFF

5. KEY TRANSPOSE

When the power is first applied, transpose value is 0.
The following chart shows the relationship between key positions and transposed values. (Set when a key is pressed while the KEY TRANSPOSE switch is being held down.)

Key	Transposed value (semitone)	Transmitted note range
power-up	0	21 – 108
F# 6	–6	15 – 102
G 6	–5	16 – 103
G# 6	–4	17 – 104
A 6	–3	18 – 105
A# 6	–2	19 – 106
B 6	–1	20 – 107
C 6	0	21 – 108
C# 6	+1	22 – 109
D 6	+2	23 – 110
D# 6	+3	24 – 111
E 6	+4	25 – 112
F 6	+5	26 – 113

6. TREMOLO, CHORUS IN TRANSMITTING

When the CHORUS (TREMOLO) switch is pressed while the Lower (or Upper) PROGRAM CHANGE switch is being held down, the CHORUS (TREMOLO) ON or OFF message is sent.
If the power has been applied with the MIDI OUT switch being held down, pressing CHORUS (TREMOLO) switch sends CHORUS (TREMOLO) ON or OFF message, whichever appropriate.

7. PROGRAM CHANGE IN TRANSMITTING

The following table shows the GROUP, BANK and NUMBER values related with key position which is set while the Lower(or Upper) PROGRAM CHANGE switch being held down.

Key	Related value
A 1	GROUP A
B 1	GROUP B
C 2	BANK 1
C# 2	BANK 2
A# 2	BANK 3
C# 3	BANK 4
D# 3	BANK 5
F# 3	BANK 6
G# 3	BANK 7
A# 3	BANK 8
F 3	NUMBER 1
G 3	NUMBER 2
A 3	NUMBER 3
B 3	NUMBER 4
C 3	NUMBER 5
D 3	NUMBER 6
E 3	NUMBER 7
F 3	NUMBER 8

When one of the above-mentioned keys is pressed while the Lower (or Upper) PROGRAM CHANGE switch being held down, a Program Change message will be transmitted.
The transmitted program change numbers are related with the GROUP, BANK and NUMBER values as follows.

GROUP A

BANK \ NUMBER :	1	2	3	4	5	6	7	8
1	0	1	2	3	4	5	6	7
2	8	9	10	11	12	13	14	15
3	16	17	18	19	20	21	22	23
4	24	25	26	27	28	29	30	31
5	32	33	34	35	36	37	38	39
6	40	41	42	43	44	45	46	47
7	48	49	50	51	52	53	54	55
8	56	57	58	59	60	61	62	63

GROUP B

BANK \ NUMBER :	1	2	3	4	5	6	7	8
1	64	65	66	67	68	69	70	71
2	72	73	74	75	76	77	78	79
3	80	81	82	83	84	85	86	87
4	88	89	90	91	92	93	94	95
5	96	97	98	99	100	101	102	103
6	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119
8	120	121	122	123	124	125	126	127

If the power has been applied with the MIDI OUT switch being held down, the following Program Change message will be sent when respective number is selected by panel operation.

Switch	Prog #
PIANO 1	0
PIANO 2	1
PIANO 3	2
HARPSICHORD	3
CLAVI	4
VIBRAPHONE	5
E.PIANO 1	6
E.PIANO 2	7

8. PROGRAM CHANGE IN RECEIVING

If the power has been applied with the PIANO 1 switch being held down, this message is ignored.

The assignment of received Program Change messages are as follows.
The program numbers 32 – 127 are ignored.

Prog #	Voice	CHORUS	TREMOLO
0	PIANO 1	OFF	OFF
1	PIANO 2	OFF	OFF
2	PIANO 3	OFF	OFF
3	HARPSICHORD	OFF	OFF
4	CLAVI	OFF	OFF
5	VIBRAPHONE	OFF	OFF
6	E.PIANO 1	OFF	OFF
7	E.PIANO 2	OFF	OFF
8	PIANO 1	ON	OFF
9	PIANO 2	ON	OFF
10	PIANO 3	ON	OFF
11	HARPSICHORD	ON	OFF
12	CLAVI	ON	OFF
13	VIBRAPHONE	ON	OFF
14	E.PIANO 1	ON	OFF
15	E.PIANO 2	ON	OFF
16	PIANO 1	OFF	ON
17	PIANO 2	OFF	ON
18	PIANO 3	OFF	ON
19	HARPSICHORD	OFF	ON
20	CLAVI	OFF	ON
21	VIBRAPHONE	OFF	ON
22	E.PIANO 1	OFF	ON
23	E.PIANO 2	OFF	ON
24	PIANO 1	ON	ON
25	PIANO 2	ON	ON
26	PIANO 3	ON	ON
27	HARPSICHORD	ON	ON
28	CLAVI	ON	ON
29	VIBRAPHONE	ON	ON
30	E.PIANO 1	ON	ON
31	E.PIANO 2	ON	ON

The assignment of received Program Change messages can be set at each channel. However, if the power is applied while the MIDI OUT switch being held down, this mode assignment does not affect the TREMOLO and CHORUS.
The assignment of received Program Change messages are as follows.
The program numbers 8 – 127 are ignored.

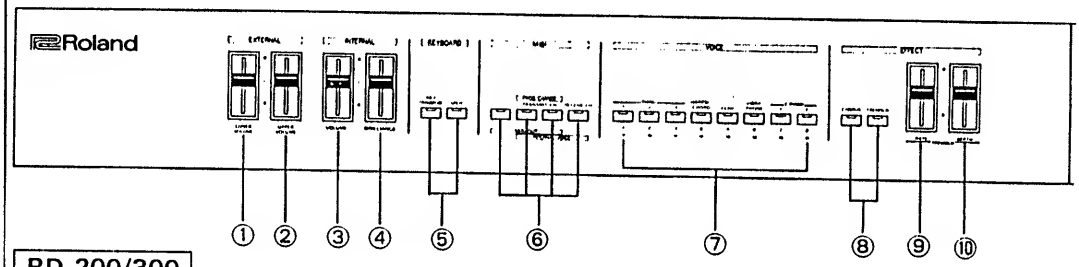
Prog #	Voice
0	PIANO 1
1	PIANO 2
2	PIANO 3
3	HARPSICHORD
4	CLAVI
5	VIBRAPHONE
6	E.PIANO 1
7	E.PIANO 2

Even if the Program Change message is recognized, the VOICE will not be changed to the new VOICE until all on-notes are turned OFF and Hold1 is turned OFF.

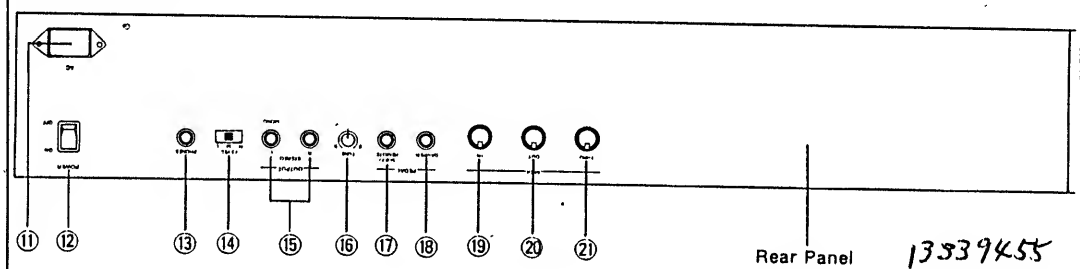
Page	WRONG 誤 →	CORRECT 正
2	(PART CODE ERROR/誤記訂正) ①② POT. EWA-NFE-X15B14 10KB 1333945~~3~~ →	13339455

RD-200/300

RD-200/300



RD-200/300



13339455

①②	Knob Escutcheon Pot.	EWA-NFE-x15B14	10KB	22485126 22225320 ~~13339453~~
③	Knob Escutcheon Pot.	EWA-NAO-x15A14	10KAx2	22485126 22225320 13359356
④	Knob Escutcheon	EWA-NAO-x15B14	10KBx2	22485126 22225320 1335933

* Please amend all existing service notes as above.
* 該当ｻｰﾋﾞｽﾉｰﾄを上記のように修正して下さい。